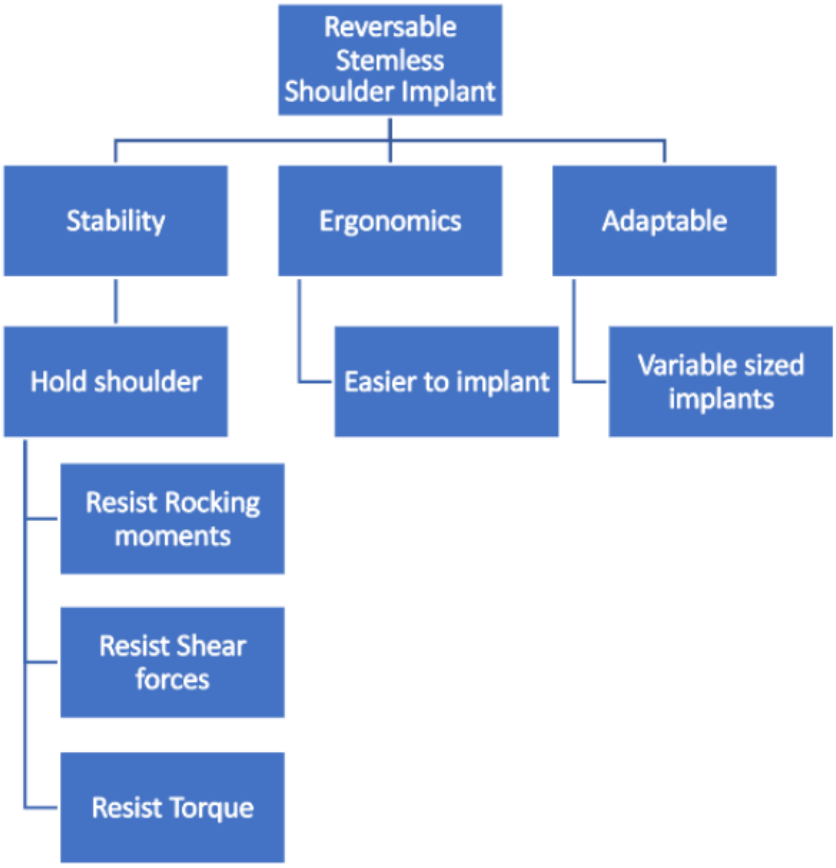
1.3 Functional Decomposition

The functional decomposition below is a dissection of the overall system into different subsystems. It takes the major functions and breaks them down into minor functions. The data was generated by listing several outcomes our design needed to achieve to be successful. From these outcomes the functions were determined. The graphics below show the function decomposition cross reference table and the functional decomposition hierarchy chart. The functional decomposition information was gathered by examining and researching the customer's needs. From these needs we were able to break down these needs into smaller components, making it easier to determine the key goals of our design. In the hierarchy chart, the higher up functions are more important and should be prioritized over the lower functions. The functional decomposition cross reference table takes the minor functions and cross references them with the major functions to determine exactly which of the major functions can be applied to them.

Function	Stability	Ergonomics	Adaptable
Resist Rocking moments	X		X
Resist Shear forces	X		X
Resist Torque	X		X
Easier to Implant		X	
Variable Sized Implants		X	X



To decompose a complex system, the system should be broken down into minor functions. These functions serve as subsystems to a broader system of major functions. It is important to acknowledge the subsystems before breaking them down into specific functions. The three major functions are stability, ergonomics, and adaptability. The stability system consists of the subsystem "hold shoulder". This function is then broken into three specific functions that can be achieved in the subsystem. For the shoulder implant to be held in place the system should resist rocking motion, shear forces, and torque. The ergonomics system is broken down into the subsystem "easier to implant". It is important to prioritize the efficiency of the implant before deciding what specifically would make the system more efficient. It was decided that making it easier to implant would improve efficiency. The adaptable function consists of the subsystem "variable sized implants". Varying the implant size would contribute to the major

function of the implant being adaptable. The major functions must take priority over all minor functions. The system serves as a hierarchy of functions to be prioritized.

Some of the systems' minor functions can be applicable to more than one of the major functions. The subsystem "variable sized implants" can also be applied using a combination of ergonomics and adaptability. This is because making implants of varying sizes will not only make the system adaptable but also more efficient and productive. By creating an implant that can resist rocking moments, shear forces, and torque it can be applied to stability and adaptability. Achieving these minor functions makes the overall system more stable but also adaptable to these outside factors.

The project has to improve upon Exactech’s current design. It should provide a reversible stemless shoulder implant that withstands certain moments and forces. It should also be easier to implant and provide a variety of implant sizes. The physical action the design will carry out will be the resistance of those certain moments and forces. This will hold the implant in place and prevent any dislocations.